

Amendments to the Claims:

This listing of claims will replace all prior version, and listings, of claims in the application:

Listing of Claims:

1-13. (Canceled)

14. (Currently Amended) A method of preparing a program for a punch press, wherein

said punch press is provided with a punch supporting member that supports a plurality of punches, a die supporting member that supports a plurality of dies corresponding to said punches and a tool storage device that stores the plurality of punches and the plurality of dies; and

identification media ~~for identifying~~ to identify each tool are attached respectively on each of said punches and each of said dies;

said punch press is provided with a punch identification medium reader ~~for reading~~ that reads out a punch identification information from a punch identification medium attached to said punch and a die identification medium reader ~~for reading~~ that reads out a die identification information from a die identification medium attached to said die;

wherein said program preparing method prepares said program by feeding a punch identification information and a die identification information from said respective

P19894.A13

identification medium readers back to an automatic programming apparatus and by allotting a punch existing on said punch supporting member and a die existing on said die supporting member to a workplace region to be processed such that a total number of replacements of punches in said punch supporting member and dies in said die supporting member is minimized,

said program preparing method comprising:

identifying punches mounted on the punch support member and dies mounted on the die support member;

generating an NC program for the punch press by selecting a punch mounted on the punch support member and a die mounted on the die support member;

identifying a punch and a die stored in the tool storage device and selected in generating the NC program; and

generating a program for replacement of the punch and die mounted on the support members with the punch and die stored in the tool storage device and selected in generating the NC program,

wherein the NC program is generated by selecting a maximum number of tools currently mounted.

15. (Withdrawn) A processing program preparing apparatus for a numerically controlled punch press, comprising:

a processing intention data generator for generating, on the basis of product shape data, processing intention data for specifying a processing region to be processed to manufacture a product; and

a tool data adding section for adding, to said processing intention data, data for specifying a punch and a die to be used to process said processing region.

16. (Withdrawn) An apparatus as recited in claim 15, wherein said processing intention data generator specifies a processing region by means of a processing starting position and a processing end position when the processing region is rectangular.

17. (Withdrawn) An apparatus as recited in claim 15, wherein said processing intention data contain a processing pattern information such as a continuously progressing punching process, a exhaustive punching-out process, and the like.

18. (Withdrawn) An apparatus as recited in claim 15, wherein said processing intention data contain a processing order information for instructing that an outside cutting process should be performed after punching operations when said processing regions include a process of cutting the outside of a product and a process of punching in the product.

P19894.A13

19. (Withdrawn) An apparatus as recited in claim 15, wherein said processing intention data generator is provided in the automatically programming apparatus, and said tool data adding section is provided in the punch press numerical controller for numerically controlling the punch press.

20. (Canceled)

21. (Previously Presented) The method of preparing a program for a punch press of claim 14, wherein said program preparing method further maximizes an efficiency.

22. (Previously Presented) The method of preparing a program for a punch press of claim 21, wherein the maximized efficiency of the program preparing method is determined by minimizing the total number of punch replacements and die replacements offset by maximizing a measure of the flatness of the finished surface.

23. (Withdrawn) The method of preparing a program for a punch press of claim 21, wherein the maximized efficiency of the program preparing method is determined by minimizing the total number of replacements of punches and dies offset by minimizing a tact time.

24. (Withdrawn) The method of preparing a program for a punch press of claim 21, wherein the maximized efficiency of the program preparing method is determined by minimizing the total number of replacements of punches and dies offset by minimizing the number of punches required to obtain a fine finish.

25. (Withdrawn) A method of preparing a program for a punch press, wherein the punch press includes: a punch supporting member that supports a plurality of punches and a die supporting member that supports a plurality of dies corresponding to the punches, identification media for identifying each tool attached respectively on each of the punches and each of the dies, and a punch identification medium reader for reading out a punch identification information from a punch identification medium attached to said punch and a die identification medium reader for reading out a die identification information from a die identification medium attached to said die;

said program preparing method comprising:

feeding a punch identification information and a die identification information from the respective identification medium readers back to an automatic programming apparatus; and

allotting a punch existing on the punch supporting member and a die existing on the die supporting member to a workplace region to be processed such that a total time for replacing punches in the punch supporting member and dies in the die supporting member is minimized.

26. (Withdrawn) The method of preparing a program for a punch press of claim 25, wherein said program preparing method further maximizes an efficiency.

27. (Withdrawn) The method of preparing a program for a punch press of claim 26, wherein the maximized efficiency of the program preparing method is determined by minimizing the total time for replacing punches and dies offset by maximizing a measure of the flatness of the finished surface.

28. (Withdrawn) The method of preparing a program for a punch press of claim 26, wherein the maximized efficiency of the program preparing method is determined by minimizing the total time for replacing punches and dies offset by minimizing a tact time.

29. (Withdrawn) The method of preparing a program for a punch press of claim 26, wherein the maximized efficiency of the program preparing method is determined by minimizing the total time for replacing punches and dies offset by minimizing a number of punches required to obtain a fine finish.

30. (Withdrawn) A method of preparing a program for a punch press, wherein the punch press includes: a punch supporting member that supports a plurality of

P19894.A13

punches and a die supporting member that supports a plurality of dies corresponding to the punches, identification media for identifying each tool attached respectively on each of the punches and each of the dies, and a punch identification medium reader for reading out a punch identification information from a punch identification medium attached to the punch and a die identification medium reader for reading out a die identification information from a die identification medium attached to the die;

said program preparing method comprising:

feeding a punch identification information and a die identification information from the respective identification medium readers back to an automatic programming apparatus; and

allotting a punch existing on the punch supporting member and a die existing on the die supporting member to a workplace region to be processed such that a total number of punches required to punch a desired hole is minimized.

31. (Withdrawn) The method of preparing a program for a punch press of claim 30, wherein said program preparing method further maximizes an efficiency.

32. (Withdrawn) The method of preparing a program for a punch press of claim 31, wherein the maximized efficiency of the program preparing method is determined by maximizing the punch size of the tools used offset by maximizing a measure of the flatness of the finished surface.

33. (Withdrawn) The method of preparing a program for a punch press of claim 31, wherein the maximized efficiency of the program preparing method is determined by maximizing the punch size of the tools used offset by minimizing a tact time.

34. (Withdrawn) The method of preparing a program for a punch press of claim 31, wherein the maximized efficiency of the program preparing method is determined by maximizing the punch size of the tools used offset by minimizing a number of punches required to obtain a fine finish.

35. (Withdrawn) A computer readable medium storing a computer program that allocates punches for a punch supporting member that supports a plurality of punches and dies for a die supporting member that supports a plurality of dies corresponding to the punches by:

reading out a punch identification information from a punch identification medium attached to each punch, with a punch identification medium reader, and reading out a die identification information from a die identification medium attached to each die, with a die identification medium reader;

feeding a punch identification information and a die identification information from said respective identification medium readers back to an automatic programming apparatus;

P19894.A13

allotting a punch existing on the punch supporting member and a die existing on the die supporting member to a workplace region to be processed such that an efficiency is maximized.

36. (Withdrawn) The computer readable medium of claim 35, wherein the maximized efficiency is determined by minimizing the total number of punch replacements and die replacements.

37. (Withdrawn) The computer readable medium of claim 35, wherein the maximized efficiency is determined by minimizing a total time for replacing punches in said punch supporting member and dies in said die supporting member.

38. (Withdrawn) The computer readable medium of claim 35, wherein the maximized efficiency is determined by minimizing a total number of punches required to punch a desired hole.

39. (Withdrawn) A computer readable medium storing a program for causing a computer to execute a method of preparing a program for a punch press, wherein
said punch press is provided with a punch supporting member that supports a plurality of punches, a die supporting member that supports a plurality of dies

P19894.A13

corresponding to said punches and a tool storage device that stores the plurality of punches and the plurality of dies; and

identification media for identifying each tool are attached respectively on each of said punches and each of said dies;

said punch press is provided with a punch identification medium reader for reading out a punch identification information from a punch identification medium attached to said punch and a die identification medium reader for reading out a die identification information from a die identification medium attached to said die;

wherein said program preparing method prepares said program by feeding a punch identification information and a die identification information from said respective identification medium readers back to an automatic programming apparatus and by allotting a punch existing on said punch supporting member and a die existing on said die supporting member to a workplace region to be processed such that a total number of replacements of punches in said punch supporting member and dies in said die supporting member is minimized,

said program comprising:

a first identifying code segment that identifies punches mounted on the punch support member and dies mounted on the die support member;

a first generating code segment that generates an NC program for the punch press by selecting a punch mounted on the punch support member and a die mounted on the die support member;

a second identifying code segment that identifies a punch and a die stored in the tool storage device and selected in generating the NC program; and

a second generating code segment that generates a program for replacement of the punch and die mounted on the support members with the punch and die stored in the tool storage device and selected in generating the NC program.

40. (Withdrawn) The computer readable medium storing a program causing a computer to execute a method of preparing a program for a punch press of claim 39, wherein said program preparing method further maximizes an efficiency.

41. (Withdrawn) The computer readable medium storing a program causing a computer to execute a method of preparing a program for a punch press of claim 40, wherein the maximized efficiency of the program preparing method is determined by minimizing the total number of punch replacements and die replacements offset by maximizing a measure of the flatness of the finished surface.